RECOLLECTIONS OF MY EARLY DAYS
AT THE OHIO AGRICULTURAL EXPERIMENT STATION

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My first serious thoughts about the Ohio Agricultural Experiment Station began in December 1910 prompted by a reply from J. W. Ames, station chemist, to an advertisment I had inserted in The Journal of Industrial and Engineering Chemistry.

Further correspondence with Mr. Ames and Director Thorne led me to resign my position with The Dairy Division Bureau of Animal Industry, United States Department of Agriculture in their cooperative laboratory at Columbia, Missouri and come to Wooster to work as a chemist on research problems for the newly established Dairy Department. Although I was first enrolled in the chemistry department my work was to be entirely on dairy problems and Mr. Ames gave me to understand that I was on my own. Mr. R. E. Caldwell, who was assistant in the department at that time, secured my enrollment in the Dairy rather than the Chemistry Department.

A small room formerly the ice storage in the southeast corner of the frame creamery building which was located just north of the big barn at its west end had been partly equipped as a laboratory. Access to this room was through the creamery. This creamery had originally been built and operated as a farm dairy to make butter or dispense milk solely from the milk produced in the station herd.

Many of the cows in the original station herd were found

tubercular and slaughtered. They had not been replaced other than by the growth of calves so the building had seen little activity for several years.

A small steam boiler, engine and dynamo in the north part of this building for some time preceding the erection of the main power plant near the Administration Building about 1909 or 1910, had been the sole source of steam and electric power at the station. It was the source of steam and heat for the creamery and laboratory until the Fall of 1912, when an underground steam line and electric cable were run from the new power plant.

The creamery rooms had been refurbished and provided with concrete floors, and small sized modern creamery equipment.

A practical butter maker, with experience in large centralized creameries in the Midwest but without academic training beyond the common school or early high school level, Mr. Ernest Timmerman, was here working on piping and the installation of the creamery machinery at the time of my arrival. A few weeks later he began making butter from cream purchased from a gathered cream route.

The water system for the barn and creamery at that time consisted of a drilled well near the north side of the creamery building from which water was pumped into a large wooden tank located upstairs in the barn from whence it was piped to the various outlets. A tread mill operated by the bulls had been the principal source of power for water pumping. Though I believe the pump could also be run by the steam engine power.

Shortly before my arrival a pipe had been run in from the new station water system so that the tank in the barn could be filled from this source. I recall several occasions when someone forgot to turn off the water and a bad mess was created in the barn, because of the tank overflowing.

Upstairs in the barn was stored a small treadmill intended for operation by a dog or other small animal. This was said to have been used to provide power for churning in the earlier days.

A Mr. Harry, brother of S. G. Harry of 629 North Buckeye Street is said to have been creameryman in early days.

The station power house near the Administration Building and the abatoir and cold storage building, now the wheat laboratory, had been completed in the fall of 1910, and at the time of my arrival the Bogner Brothers' carpenters, were at work remodeling the west end of the big barn. The old individual wooden stalls and mangers were being torn out and stalls and mangers of a type designed and favored by a dairyman member of the Board of Control (Scott) were being installed. Though not without their faults. These stalls were retained until the dairy department abandoned the barn some 40 years later.

The East end of the stable continued to be used to house the Angus herd for several years after this, and, the old wooden stalls were retained in that part of the barn.

Purchase of the Fry Farm by the Experiment Station enabled the Angus herd to be moved there and the Dairy Department to occupy the entire stable floor of the barn. The upper floors of

the barn at that time and for many years after were used extensively by the Department of Agronomy for threshing and for the care and storage of seeds.

The pavement of Madison Avenue as far as Apple Creek bridge had been laid in the fall of 1910. The first ten foot strip of paving up Madison Hill was laid in the summer of 1918 by Arthur Miller and a gang of Amishmen from Millersburg. The mixing of concrete was done by hand. This was about the beginning of the Holmes Construction Company. The water supply in Wooster's city mains at the time consisted largely of water pumped from Apple Creek at a point near the Madison Avenue bridge where the Wooster Sales Company now operates. Most people in the city depended on spring or well water for drinking and cooking.

In addition to Mr. Caldwell and Mr. Timmerman there was in the department at the time of my arrival Mr. T. R. Middaugh, who served as clerk and remained as such for several years leaving to take up work at the Wayne Building and Loan Company of which he is now listed as treasurer. Mr. Earl Stauffer a young energetic and capable man was serving as herdsman. He came from near Sharon Center in Medina County. When Mr. Caldwell went to Purdue in the Fall of 1911, Mr. Stauffer soon followed him. Later he returned to Ohio to take over the family farm in Medina County. I have talked with him as he has visited the station on some of the special days. He was not included in the roster of station employees compiled by Director Thorne as a Station Bulletin No. Mr. Hayden arrived to take charge of the department in May 1912.

The department office at this time was located in a south room on the second floor of what was known as the Hickman House located at the corner of Madison Avenue and the station entrance directly west of the Administration Building, the house that has since been occupied by W. H. Kramer, Ben Sidle, and The Sutherlands. The Department of Cooperation with a large staff and the Department of Animal Husbandry also had their offices there.

A printed circular of rules and regulations for station employees was sent me before I came here. I remember some of them as follows:

Ten hours was stated to be the standard working day. (There was no exception of Saturday at this time) and no mention of different hours for different jobs.

Two weeks of vacation were allowed per year but if the usual holidays were taken these were to be deducted from the vacation.

It was stated that employees might be allowed the occasional use of a horse and buggy.

Employees were enjoined from keeping mongrel poultry.

The hours as stated seemed much longer than those required in the laboratory where I had been employed, but I had worked long hours on other jobs and I figured I could do it if the rest could.

Imagine my surprise on coming here to find office and laboratory personnel working only an eight hour day. Many of them stringing in for 1/2 hour or more after official opening time.

I believe the 10 hour day had once been in effect for these

employees as well as labor but the regulation had broken down.

The regulation permitting Saturday afternoons to be taken off began I believe about 1917 or 1918. It provided that the various offices were to be kept open with one person in attendance.

Before my arrival here it had been decided that the major research project was to be regarding the effect of different levels of protein feeding on the animals themselves, their offspring and the product. The herd at that time consisted of about 20 cows varying widely in age, breeding and productive capacity. The six selected for our experiment reflected this extreme variability but were the best available. There were two pure bred Jerseys of very mediocre productivity, one Jersey Holstein cross a good producer and another grade Holstein. One carried some Guernsey blood. The herd numbers of these cows ranged from 53 to 67. They were in either their first or second lactation.

While I fear the plan as written up and adopted came far short of the expectations of those suggesting the experiment, it still by far over estimated the results which might be reasonably expected to accrue from the work, taking into consideration the animals and facilities available.

The continuous dry feeding of these cows throughout the year was a marked innovation here at the time, and was a source of much comment and interest for visitors.

When the steam and electric lines were run from the power house to the barn and creamery in August 1912, the trench had been dug and an opening made through the basement wall of the

creamery building. One night a torrential rain occurred, amounting to several inches. The same rain drowned out the Wayne County Fair, postponing the date by about a month. The water in quantity ran down the slope into the trench and down this trench into this basement. The drain plugged up and the basement was completely filled with the muddy water. Chemical glassware stored in the basement and such other supplies as would float were bobbing about like corks in the muddy water.

Dr. E. B. Forbes founder and head of the Department of Nutrition was very jealous of the prerogatives of his department and actively opposed anything resembling Animal Nutrition Research being done by other departments hence he was very critical of our work. His comment on seeing the results of the storm was, "Huh !" simple case of cause and effect."

In November 1913 the new East wing of the Administration Building was under construction,

On Sunday, I believe it was the 10th or possibly the 11th of November, there was quite a heavy fall of snow, in the neighborhood of a foot, this was soft at first but zero weather followed on the heels of the snow and the road up Madison Hill was well nigh impassible. When I was eating my supper Tuesday night, the telephone rang informing me that the creamery building was on fire. I hurried out as rapidly as possible on foot. The fire had evidently started in the northwest corner of the building near the point where the old steam engine and dynamo had stood prior to their removal. The laboratory was located in the opposite or southeast corner and there had been no fire whatever in the

building that day since I had been working on records rather than at chemical work.

The creamery was connected with the barn by a covered hallway and it was feared the fire might spread to the barn. When I arrived quite a number of station employees were already there and had a line of fire hose in operation. Efforts were directed chiefly toward keeping the fire from spreading to the barn. In this we were aided by a light breeze from the South.

It was thought best to remove the cattle from the barn so they were turned into the small pasture east of the dairybarn until it was felt the fire was under control and the danger past, then they were returned to the barn.

Two men from the farm force were assigned to watch during the night by Mr. Wm. Holmes, farm foreman, who suggested that my services would be more needed in the salvage operation the following day. Mr. Hayden then department chief had left Wooster on Monday and was in southern Ohio at the time of the fire.

The roof and attic floor of the building were mostly burned and the ceilings of the rooms below were burned or broken through by heavy material stored above, though the floors and side walls of these main rooms were still largely intact. In the laboratory, equipment located above the table tops was mostly destroyed while that in drawers or below the table tops was little damaged.

Most of the salvaged material from the burned building was taken to the third floor of the barn but laboratory equipment was

moved to a room over the power house adjoining the baking laboratory. This room though unsatisfactory as a laboratory served as a headquarters for the laboratory work until we were able to move into the present building.

One more or less humorous incident which occurred at the time of the fire was that a Mr. Gearhart a rather stocky young assistant in Agronomy, who had been working with soybeans which were stored in the barn came panting up the hill when it looked as though the barn was doomed, saying, "My God, my beans !."

The morning after the fire at the suggestion of Director Thorne, the cream separator and milk dispensing equipment were moved to a small little used room in the basement of the cold storage building from which place these operations were conducted until the less damaged portion of the old creamery building was re-roofed and otherwise repaired in the summer of 1914. The milk work was then handled from this location, since used as the men's dressing room, until it was transferred to the south basement room in the new building in 1915. This fire resulting in the destruction of the old creamery building although it resulted in much inconvenience at the time was really , I believe, a blessing in disguise. The ashes of the building were scarcely cold before Mr. Hayden in consultation with the state architect, began to figure on plans for the new dairy building to provide adequate room for offices, laboratories, and the care of milk and manufacturing facilities under one roof. Some of the original plans for the uses to which parts of the building would be put,

were never carried out, but altogether it has served the department well. Work on the new building was started in the Fall of 1914 and much of the work including the concrete floors was done in the winter time. Parts of the new building were occupied in the summer of 1915 though lack of equipment delayed full occupation until considerably later.

The Experiment Station of the early days had very few tradesmen or maintenance personnel. Mr. Harvey Camp was the only one available at that time for such work as plumbing. Mr. Camp was later chief operator at the new City Water Works and now retired, he is service director of Wooster. Mr. Camp and I did all the work of installing plumbing and fixtures in the new laboratory. For me this was valuable experience but it did not serve to expedite the chemical work.

While carrying on the salvage operations the next day after the fire, a man came along and applied for work and since we were short handed at the time, I hired him subject to the approval by Mr. Hayden. This man was Calvin J. Beam a most capable and conscientious worker who later became herdsman serving in that capacity for several years.

On the trip from Columbia, Missouri to Wooster, we came from Saint Louis via The Big Four Railroad. I left the train at Crestline late Sunday evening and spent the night in Crestline, arriving in Wooster early the next afternoon. My wife and two small children continued on the same train to Syracuse New York, where she stayed with her mother and sister until I could locate a

house and have our goods shipped here. After some time I took over the lease of a house on Quinby Avenue opposite the high school building from A. C. Whitter, a station employee, who was leaving Wooster to take up work at the Delaware Experiment Station. I took over the house on May 1st and our goods and my family arrived shortly after. The contract called for a rental of $15.00 per month for the house of 7 rooms modernized except furnace.

My starting salary was $1200 per year, which was considered high at this institution at that time. The late J. S. Houser who was later chief in Entomology told me that when he started work here about 1908, his starting rate was $600 per year. That also had been the salary at which I started in a steel laboratory at Syracuse, New York soon after leaving college in 1906 and before going to the government laboratory at $900 per year. The starting rate for men in the barn at this time was 15¢ per hour with a top of 18¢ per hour after a considerable length of time.

One phase of work which required a great deal of attention particularly in the summer time in the early years was the preparation of fair exhibits. The station maintained three exhibits in as many large tents, each of which visited ten county fairs during the season. A crew of 3 men traveled with each of these exhibits but of course, the preparation and annual overhauling of these exhibits was the responsibility of assigned members of the scientific staff. In addition to these, a much more elaborate exhibit was made at the State Fair than is now the

case. Each department made a bigger exhibit than the combined station exhibit of recent years. The exhibit was shipped in a freight car about a week in advance of fair opening. A few days later two or more persons from each department went to Columbus to install the exhibit.

Sometimes difficulty was encountered in getting the car placed so that the exhibit could be unloaded in which case a number of men were left waiting around the fair grounds with nothing to do. Going to Columbus was not the simple 2 hour auto trip of today. Travel was by train and that usually involved a lay over at either Orrville or Crestline. The one way trip consumed a full half day. Most people working at the fair found it necessary to spend one to several nights in Columbus.

When we were located in the new building, R. I. Grady who had worked in the Dairy section of the former Department of Cooperation, while also a college student, and was in charge of that work at the time the Cooperation Department was dissolved, expressed a desire to transfer to the Dairy Chemistry Laboratory since he was studying chemistry at the college. The transfer was arranged and Mr. Grady assisted with the chemical work. I believe he received college credit for the work done in our laboratory. Later he registered for his Masters Degree in Agricultural Chemistry at Ohio State and completed the requirements while working here. Mr. Grady is now head of the Chemistry Department of Wooster College.

Mr. C. F. Monroe joined the department about 1921 also as

assistant in the laboratory, and also received his Masters Degree as the result of work done there.

Although there were several paved streets in Wooster in 1911, there were comparatively few automobiles. Hitching posts and rails were still common on the square and in front of business places and elsewhere. There were also many of them about the station. Several of the older and better established station employees drove or rode horses back and forth to work. Director Thorne, A. D. Selby, L. H. Goddard, C. C. Hayden and probably others, often traveled in this manner. C. G. Williams, who had lived in the house now occupied by G. A. Hummon, and moved to town about 1912, was the first station man to own an auto, a Ford car, which he later sold, when getting another, to H. A. Gossard. Foot travel and bicycle travel were the most common means of getting back and forth from city to station. The path down the hill now deserted was well filled with pedesterians in the morning and at closing time.

In my early years here, there was but one field day regularly held, this was wheatfield day held just about the time wheat was beginning to turn each year. Crowds were necessarily small for most people in attendance either drove horses or came on the train or electric line. It was almost necessary for anyone coming from a distance to come the preceding day and spend the night in Wooster. Director Thorne's favorite method of showing his plot experiments was to mount his horse and speak from the saddle to the visitors who walked from station to station. For

many years, a special driving team of blacks and a carriage of state were kept to meet distinguished guests at the railroad station.

Possibly the interest in wheatfield day, combined with the greater ease of travel by automobile which became common about this time, led to the adoption of special days for the presentation of the work of the various departments rather than so large a dependence on fair exhibits. In line with this policy, Dairy Day was instituted in 1928 in cooperation with the Ohio Dairymen's Association and the Agricultural Extension Service.

From the first, it has seemed to be a decided success, both in attendance and interest. Through all the 26 years of its history, I believe there was only one occasion, the second year, when rain seriously interferred with the program. Then every one seemed to take the interference good naturedly. At first there were no personnel or organization to look after the handling and comfort of the crowds in such matters as seating, drinking water supply and parking. It was necessary for the members of the department to look after all such details in addition to the general clean up and the presentation of ones own work.

On my arrival here and probably until about 1920, much of the milk produced by the station herd was sold in the raw condition to station employees or to others who brought their own containers into which the milk was poured. In 1911 and for sometime thereafter, the price was 5¢ per quart. Cream was also separated and a cream of about 20% butterfat content was marketed in single service pint containers, at first through Smith and Lautzenheiser's

Grocery. Later some other stores also carried it. For a considerable time boys from town organized routes and delivered station milk to customers. Dealers in town making objection to this practice, it was discontinued and the station would retail no more milk. Whereupon, the Station employees organized and appointed a milk committee, which bought milk from the Station at wholesale and employed someone to distribute it. My three sons one after the other performed this work over a period of perhaps 8 or 10 years. After they outgrew the job, service became more or less irregular. Due to this and the possibility of disease transmission through the raw milk, a pasteurizer was installed and the milk contracted to the Apple Creek State School, which is the present arrangement.

During the period of about 1917-1920, because of the general scarcity of labor and the low wage rate paid at the Station, considerable difficulty was encountered in keeping a full force of men in the dairy barn. One spring morning during that period found us entirely without a barn force save only Mr. Beaty the herdsman. It wasn't exactly a strike but the men all decided to quit at once. Since spring work was in progress, the Agronomy De artment, which usually helped out at such times, was unable to do so. To meet the situation, Mr. Hayden, Mr. Vordermark, from the office, and yours truly transferred our base of operations to the barn for some time until a new barn crew could be recruited. On several occasions in the early years, the writer found it necessary to take a turn either in the barn or at caring

for the milk in the creamery sometimes for considerable periods.

No account of activities at the Ohio Agricultural Experiment Station from 1917 through 1921 or 22 would be complete without some mention of the Forbes, Carmichael controversy which during much of that time had the whole institution in pretty much of a turmoil. Dr. E. B. Forbes was usually quite aloof and of a sullen and sarcastic manner, He was very jealous of what he considered as the exclusive prerogative of his department, therefore, of any animal feeding operation other than routine feeding tests of the simplest kind.

Naturally, B. E. Carmichael as chief of the Department of Animal Husbandry with one assistant in swine work, one in sheep work and another in poultry work, did not assign the same limitations to their work as those envisioned by Dr. Forbes.

The station had recently provided the building and special equipment for use as abatoir and cold storage of which Dr. Forbes was in custody and which Carmichael and his staff desired at times to use. Another point of friction.

Early in 1918, Dr. Forbes was to be appointed as major in the United State Army to carry on Nutrition work there. Instead of rejoicing that his rival was leaving the field, Carmichael, who on the whole was a more likeable and congenial person than Forbes, sent letters to the congressman and senators making numerous trivial charges reflecting on Forbes character and trying to head off the appointment. Of course this was immediately referred to Station officials who cleared Forbes and suspended Carmichael.

Carmichael had been given to pointing out small errors in publications prepared by other departments and when Dr. Forbes had published a very extensive review of the literature on Mineral Metabolism, Carmichael referred to him as a "Scissors and paste pot scientist."

Carmichael procured strong attorneys and appealed his suspension to the Civil Service Commission, also to the Wayne County Common Pleas Court. The station administration was inadequately represented by attorneys at both these hearings so an injunction was secured which virtually placed the station under the jurisdiction of the court for a year or more. This was still the situation when Dr. Forbes returned from military service.

In the meantime, Carmichael and assistants assumed the role of super patriots in such matters as Red Cross subscriptions and government bond sales. In order that the affair could be settled it was necessary that both men leave the station.

Forbes succeeded Dr. H. P. Armsby at the Institute of Animal Nutrition at Penn State College, where according to unsolicited testimony from acquaintances at that institution, his propensity for nettling and antagonizing other people in related fields was still much in evidence.

Carmichael became manager of a private breeding enterprise in the vicinity of Washington, D C., and the assistants who had actively sided with Carmichael and against the Station Administration, also left the station employ at about that time.

Projects and Publications: The long time nature of our major research project was not conducive to the early production of publications in that line.

The desire of the buttermaker for a simple accurate and very rapid method for salt determination in butter because of the recently enacted federal standards for moisture and salt in butter, led me to work out a method for titrating the salt in the residue from the Gray Moisture test in use in the creamery at that time. This was published in two or more of the creamery Journals of that time.

Work begun at the University of Missouri and used as my Master's Thesis there, was extended here and later published as, "An Apparatus and Method for Determining the Hardness of Butterfat," in J. Ind. and Eng. Chem. Vol. VI No. 2.

A popular article on the care of Cream was prepared and published as No.134 in the Circular Series of the Ohio Agricultural Experiment Station.

The inauguration of the Monthly Bulletin in 1916 which later became the bimonthly, furnished an outlet for articles of a more popular and timely nature than either the monograph bulletins or the circulars of the era which preceded.

Articles written by me will be found in the October and December Numbers of that year and more or less frequently thereafter. My first two articles in the Monthly Bulletin dealt with the composition of skim milk and buttermilk and their high food value, which at that time was very little utilized in

human nutrition and not fully appreciated as a livestock feed. As a sequel to this, I made some studies on the centrifugal recovery of cottage cheese from buttermilk which was new at that time. This will be found in Monthly Bulletin No. 28 and No. 36 also.

Beginning about 1915 or 1916, I was called on to carry out the chemical analyses in connection with a study of the relative merits of the standard field corn and the large rank-growing later varieties of corn for silage. This work extending over a period of 5 years was published as Bulletin 369.

Some of the detailed chemical work in this series also led to additional work published as Bulletin 370.

This work also served as an introduction to the ensiling of other crops than corn, particularly hay or meadow crops which later occupied the attention not only of myself but of most other members of the Dairy Department for several years. This work is reported in numerous articles in the Bi-monthly Bulletin #177, #184, #190, #192, #194, and #208.

About 1940 the silage work which up to this time had been confined mostly to the Dairy Department, became sufficiently popular so that several other departments wanted a share in the work. A conference was held with one or more representatives from each of the following departments present: Agronomy, Animal Industry, Agricultural Engineering, Botany, Agricultural Economics and Dairying. As the result of this conference, the project known as B. J. 35 was set up.

The Agricultural Engineers and C. F. Rogers of Agronomy assumed charge of the erection of a special building, housing 24 silos of 1 ton capacity of 4 different materials. These silos were each filled two or three times during the growing season. The material as ensiled and silage as removed were thoroughly sampled for chemical analysis. The analysis of these samples fell to the lot of the writer, some of the methods used were original with me and had been derived from previous silage work. Much detailed work was involved in these analyses and little use has ever been made of this data. Previously some work had been done by the writer with a few units of what came to be known as "The Silo Press." Other conditions were quite readily controllable with this equipment. Small quantities were used and different pressures representing those occurring at various depths in the silo readily matched. The dquipment proved especially valuable in showing the effect of dry matter content of crop and silo pressures on the loss of liquid from ensiled crops. Our data were the first in this field.

Additional units of equipment were provided and the work expanded as one feature of project B. J. 35. Later the A. O. Smith Corp. supplied 24 units of glass lined silo presses. These, however, were used only a comparatively short time before the writer was retired and the work abandoned. An article in Jour. Dairy Science and a Research Circular #18, April 1953, prepared through the cooperation of Dr. Pratt, report something of these results. This work gave proof that ensiling losses might be much

smaller than commonly thought. A reason for the difference in the results from those usually reported was sought in the method used for dry matter determination in silage analyses. Parallel determinations of dry matter in various green crops and in numerous samples of silage were run by the methods of oven drying and that of distillation with an excess of toluene and volumetric measurement of water.

There was little or no difference in results in the case of green plants commonly used in silage making, however, some green materials such as mint and cherry leaves showed considerable difference. In silages, the differences were marked. In many cases they fell between 1½ and 2 percent of the fresh weight of the silage equivalent to about 8 and sometimes as high as 10% of the dry weight. Hence, many of the high ensiling losses reported are probably due in part to volatilized dry matter, in dry matter determinations made by oven drying, being considered as moisture. This is reported in the January 1943 issue of the Bi-monthly Bulletin #220. Charges by certain highly placed feed fadists that silage was harmful to cows because of its high acid content, led to a series of studies in which food grade lactic and acetic acid absorbed on dried beet pulp were fed to cows over considerable periods, the amounts being gradually increased until the cows began to refuse the acid treated feed. Amounts equivalent to 1½ lbs. of either of these acids per day were readily taken. Studies on the blood and urine of these cows showed that there was no such effect as is produced

when very much smaller amounts of mineral acid are fed. These results are reported in the Journal of Dairy Science, and the Bi-monthly Bulletin.

Extravagant claims and advertising as to the benefits to be derived from such practices as the fermenting of chopped roughage to make it practically equal in feeding value to grain were emphatically made. One such process known as "Sugar Jack" had some high placed endorsements which almost made it necessary that we study it. This was done and most of the claims were shown to be entirely without foundation.

Somewhat later, extensive claims and elaborate advertising proclaimed the great advantage to be gained by grinding roughage and mixing it with the grain before feeding. Rather extensive work showed that in this case, also, no practical benefit and some possibility of damage attended the feeding of ground roughage. This is published as Bulletin #502 and in Bi-monthly Bulletin #163.

The development of modern machinery called for studies of ways of applying it to improve the methods of hay making. Loose baling of hay in the field and the ventilating of partly cured hay in the mow are two such methods.

Studies on mow ventilation were initiated here by Professor Miller of Agricultural Engineering, using a home made fan. After a year or two the distribution system for air was remodeled and a more efficient commercial fan provided. Other members of the Agricultural Engineering staff, carried on this work in later

years. The writer made careful chemical studies at all phases of the work. Some of these results have been reported in Bi-monthly Bulletins and in the Journal of Dairy Science.

After several years of continuous feeding of the wide, medium and narrow rations ranging from 1:9 to 1:4, there was little or no observable difference in the effect of these rations on the health or condition of the cows, nor any considerable difference in the amount or character of production which seemed definitely traceable to the difference in level of protein feeding. These results were quite at variance with Haecker's deductions from the short time work on which his standard was based, but were in full agreement with the long time experiments of Hills et al. of the Vermont Experiment Station, published at about the same time as our own, reported in Bulletin #389.

Later, some of the cows raised on the 1:9 ration were changed to a 1:11 ration. The production on this ration averaged considerably more than on the previous ration possibly as the result of greater palatability and feed consumption. The animals still retained a good workable condition.

Three series of metabolism experiments were conducted on representative cows from each group in mid lactation. These gave data which was very helpful in interpreting the results of the experiment as a whole, reported in Bulletin #376, also in Journal Dairy Science.

Later, even more extreme rations having nutritive ratios of

1:2 and 1:13 respectively were fed continuously for several years. In making up these rations, it was necessary to depart entirely from the practice originally adopted of compounding the experimental rations from the same feeds but used in widely different proportions. It was even necessary to go outside the list of commonly used feeds and use such feeds as blood meal and wheat gluten in connection with the common high protein concentrates in making up the 1:2 ration. Rather large amounts of corn starch and molasses in connection with corn, timothy hay, and heavy silage feeding were used in the 1:13 ration. The cows on the 1:13 ration produced surprisingly well but became very thin "hat rack cows" in middle to late lactation. They seemed to breed regularly and produced normal calves of good weight. The cows on the 1:2 ration remained in good flesh throughout lactation but their breeding seemed to be somewhat delayed leading to a longer lactation period. Their production was also quite good but the great excess of protein in the ration had worked no marvels as a stimulant to production and had probably depressed it to some extent. Extensive studies on the composition of the milk, blood urine and to a lesser extent, the saliva and bile, were made. These results have never been published in detail but summaries have appeared in papers before The Dairy Science Association. Some are included in Bulletin #515 and in annual reports.

Urea as a principal cleavage product of protein metabolism in the body seemed to be the chief variant. It was greatly reduced in the blood and at times practically disappeared from

the urine of the cows on extremely low protein feeding. "A Method for the Determination of Ammonia and Urea in Milk" will be found in Analytical Edition of Ind. & Eng. Chem. Vol. 10 p. 69 (193). On the other hand, the urea content of the blood of the high protein fed cows was usually three or four times that found in cows fed on the customary rations and the urea content of their urine was 100 or more times as great as that of the opposite group of cows.

The urea content of the milk and other body fluids followed more or less closely that of the blood. A few later tests showed that where urea itself is fed there is no such increase in the blood urea.

General results from these experiments will be found in Bulletin #376, 389 and 515.

Other work regarding the level of protein feeding was done at the Hamilton County Experiment Farm and in the Wooster herd when on summer pasture. This will be found in the Bi-monthly Bulletin Nos. 132, 138, 147 and 167.

The American Dairy Science Association developed from its predecessor, The Dairy Instructors Association which had been organized about 1909 or 1910 at a summer graduate school sponsered by the U. S. Department of Agriculture. For several years the meetings were held in connection with the National Dairy Show. The meeting was usually held at some big down town hotel in the convention city, and was confined to one day.

The program usually consisted of an invited address, reports

of officers and committees, business and the election of officers. There was little opportunity for anything in the way of reporting scientific work.

The writer joined the Dairy Science Association and began attending the meetings about 1921. The high expenses of the city hotel type of meeting and the noisy, hurried and unsatisfactory character of the programs had made an unfavorable impression on at least one member. Previously, I had enjoyed the experience of a summer meeting of a different group held at a college where conditions seemed much more satisfactory. Accordingly, at the meeting held at Indianapolis in 1926, I aired my views and moved that a summer type of meeting at a college be tried. The motion drew strong support from Professors Eckles, Morrison, Ellenberger and others. D. E. Reed of Michigan State College invited the group to meet there in 1927. The motion carried and Reed's invitation was accepted. Dr. Kraus, then a new member of the Department, and Messrs Monroe and Perkins attended from Wooster. This first summer meeting was a success and set the pattern for future meetings of the Dairy Science Association. At first there was some question as to whether or not the summer session was the official meeting for the transaction of business, but this question was soon settled in the affirmative.

A memorable incident of a personal nature occurred during the winter of 1911-12 when the department was without anyone particularly in active charge of barn activities. In the early part of

the winter, the gutters and alley where the cows walked were sprinkled with ground phosphate rock which became mixed with the manure to produce what was known to the Agronomists as treated manure to use in their plot work. This treatment also prevented the cows from slipping on the smooth concrete when coming into the barn.

Sometime in midwinter, the farm foreman, without explanation, told the men in the barn to stop using the ground rock. The men reported to me that the cows were slipping badly on coming into the barn from the snowy yard, with likelihood of injury. I told them in that case to go ahead and use the ground rock if that prevented the slipping. This soon brought the farm foreman to me with dire threats of what would happen to me if their plans of collecting untreated manure were interfered with. Being a new man in a new department and acting in a substitute capacity, I was duly impressed with the magnitude of my mistake. On taking the matter to Director Thorne, however, he calmly suggested that they could easily arrange to get their untreated manure from barns where the stock was continuously confined.

To close in a somewhat lighter vein, it was formerly customary for the whistle at the power house to sound at the beginning and again at the close of the noon hour. While I was quartered over the power house after the fire, I used to receive the full benefit of this deafening blast. One day the whistle sounded and I proceded to eat my lunch as usual. Then after a time I went out to meet the others for a noon day chat only to find that it was not yet noon. The whistle had

been blown to call the engineer back to the power house. Probably I had an unusually good appetite for supper that night, I don't remember.

One feature of Station life which the writer always greatly enjoyed was the trips by automobile with other members of the group, to meetings of the American Dairy Science Association. One year on a trip to Washington, D. C., we arranged to leave early, stopping for breakfast at Canton. The next year, the meeting was in a western state and again we were to start early. I assumed that we would again stop for breakfast on the road, only to find when we were well started that all the others had eaten at home. My breakfast furnished the subject for humerous conversation until I finally ate it at Fort Wayne, Indiana, while the rest ate lunch.

On a few occasions, Mr. Vordermark, who served for many years as clerk or office assistant, went with the group to the Dairy Meetings. Bill furnished humor by his propensity of wanting to inspect the beds for other occupants when engaging quarters for the night.